CLAIMS

What is claimed is:

1. A coaxial rotor system comprising:

a first rotor system which rotates about an axis;

a second rotor system which rotates about said axis, said second rotor system spaced an axial distance from said first rotor system; and

a rotor control system which independently controls said first rotor system and said second rotor system to maintain a minimum rotor blade tip separation between a first rotor blade tips of the first rotor system and a second rotor blade tips of the second rotor system.

2. The coaxial rotor system as recited in claim 1, further comprising a rotor blade tip position sensing system in communication with said rotor control system.

3. The coaxial rotor system as recited in claim 2, further comprising a rotor blade mounted member to independently control each rotor blade of each of said first rotor system and said second rotor system in response to said rotor control system and said blade tip position sensing system.

4. The coaxial rotor system as recited in claim 3, wherein said rotor blade mounted member comprises a servo flap.

5. The coaxial rotor system as recited in claim 3, wherein said rotor blade mounted member comprises a tip brake.

6. The coaxial rotor system as recited in claim 2, further comprising a first pitch control assembly which articulates said first rotor system and a second pitch control assembly which articulates said second rotor system, said first pitch control assembly controlled independent of said second pitch control assembly in response to said rotor control system.

7. The coaxial rotor system as recited in claim 1, further comprising a first swash plate which articulates said first rotor system and a second swash plate which articulates said second rotor system, said first swash plate controlled independent of said second swash plate in response to said rotor control system.

8. The coaxial rotor system as recited in claim 1, further comprising a higher harmonic blade control which independently articulates said first rotor system and said second rotor system in response to said rotor control system.

9. The coaxial rotor system as recited in claim 1, wherein each of said first and second rotor systems comprise a multiple of bend-twist coupled rotor blades.

10. The coaxial rotor system as recited in claim 1, further comprising a flight control system in communication with said rotor control system to prohibit entry into a predefined portion of a flight envelope which exceed said minimum rotor tip separation.

11. A method of controlling a coaxial rotor system comprising the steps of:

(1) locating a first rotor system and a second rotor system along a common axis, the second rotor system spaced an axial distance from the first rotor system; and

(2) independently controlling the first rotor system and the second rotor system to maintain a minimum rotor blade tip separation between a rotor blade tip of the first rotor system and a rotor blade tip of the second rotor system.

12. A method as recited in claim 11, wherein said step (2) further comprising the step of:

independently controlling the first rotor system and the second rotor system through one or more rotor blade mounted control surfaces located on each rotor blade of the first rotor system and the second rotor system.

13. A method as recited in claim 12, further comprising the step of:

pitching each of a multiple of rotor blades of the first rotor system a multiple of times during each rotation of the first rotor system through a higher harmonic control system; and

independently pitching each of a multiple of rotor blades of the second rotor system a multiple of times during each rotation of the second rotor system through the higher harmonic control system.

14. A method as recited in claim 12, further comprising the step of:

actuating a tip brake on at least one of a multiple of rotor blades of the first rotor system to maintain the minimum rotor separation between the first rotor system and the second rotor system.

15. A method as recited in claim 11, wherein said step (2) further comprising the step of:

independently controlling the first rotor system and the second rotor system through a respective first pitch control assembly and second pitch control assembly located remotely from the first rotor system and the second rotor system.

16. A method as recited in claim 15, further comprising the step of:

pitching each of a multiple of rotor blades of the first rotor system a multiple of times during each rotation of the first rotor system through a higher harmonic control system; and

independently pitching each of a multiple of rotor blades of the second rotor system a multiple of times during each rotation of the second rotor system through the higher harmonic control system.

17. A method as recited in claim 11, wherein said step (2) further comprising the step of:

limiting a flight envelope to maintain the minimum rotor separation.

18. A method as recited in claim 11, wherein said step (2) further comprising the step of:

coupling a rotor blade bend-twist relationship on each of a multiple of rotor blades of the first rotor system and the second rotor system to maintain the minimum rotor separation between the first rotor system and the second rotor system.

19. A method as recited in claim 11, wherein said step (2) further comprising the step of:

limiting the minimum rotor blade tip separation to approximately 3 percent of a rotor diameter of the first rotor system.

20. A method as recited in claim 11, wherein said step (2) further comprising the step of:

spacing the first rotor system and the second rotor system along the common axis an axial distance less than 10 percent of a rotor diameter of the first rotor system and the second rotor system.

21. A method as recited in claim 11, wherein said step (2) further comprising the step of:

adjusting the minimum rotor blade tip separation in response to an area of a flight envelope.